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## E-governance in Eastern and Southern Africa: a Webometric study of the Governments' websites

### Abstract:

This paper explores the adoption of one of the Information and Communication Technology (ICT) tools, i.e. the Internet and more particularly, the World Wide Web, by Eastern and Southern African governments as a means of facilitating interactions between the state and its citizens. It was observed that most governments in the region have constructed their own Web sites, some of which are up to date. English is the most commonly used language to prepare the web sites. Other findings include: foreign missions recorded the highest number of web pages followed by political parties; the **.com** or **.co** Top Level Domain (TLD) generated most web pages followed by **.ac** or **.edu** in each country; most governments provide contact information as opposed to sitemaps and feedback forms which recorded relatively few postings; governments with few webpages and large quantities of in-links (including self-links) recorded high Web Impact Factors (WIFs); and only the South African government provided links to other Eastern and Southern African governments. Ethical issues regarding the analyzed variables as well as conclusions and recommendations are provided.

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## Introduction

Information and Communication Technologies (ICTs) are increasingly becoming important tools by which individuals, corporate institutions/organizations and even countries not only create, store, disseminate and use information but also market their services and products. The Internet, being one of the modern ICT tools, offers several opportunities and services such as electronic commerce, web-based education, electronic mail, and Electronic governance, among others. E-governance is defined as the "use of ICTs to promote efficient and effective government, facilitate more accessible government services, allowing greater public access to information, and making government more accountable to citizens" (Jensen, 2002: Introduction, para 1). It involves the delivery of government services and information to the public using electronic means. The United Nations Educational, Scientific and Cultural Organization [UNESCO] (2005: what is e-governance?), provides an elaborate definition of E-governance thus: "the public sector's use of information and communication technologies with the aim of improving information and service delivery, encouraging citizen participation in the decision-making process and making government more accountable, transparent and effective". Backus (2001:n.d.) gives E-governance a commercial impetus. The author argues that E-governance is a form of e-business in governance and defines it as the application of *electronic means* in: (1) the *interaction* between *government* and *citizens* and *government* and *businesses*, as well as in (2) internal *government operations* to simplify and improve democratic, government and business aspects of Governance".

According to Chisenga (2004), e-governance is meant to fulfill the following goals:

- Improve the internal organizational processes of governments
- Provide better information and service delivery
- Increase government transparency in order to reduce corruption
- Reinforce political credibility and accountability
- Promote democratic practices through public participation and consultation

An audit of the technological developments in Africa indicates that most governments in the continent are vigorously promoting the use of ICTs in the provision of their services to the respective citizens. A study conducted by Chisenga (2004) noted that majority of the African governments are finding their way into cyberspace through the construction of their own websites. It has been observed, however, that the mere ownership of a web site does not mean effective e-governance (Waiswa, 2006). Quoting Dr. Subhajit Basu, a lecturer at Queen's University Belfast, Waiswa (2006) agrees that ICTs only support and stimulate good governance. Websites, nevertheless, are essential tools (and sometimes pre-requisites) for governments to realize or attain any effective e-governance. According to Sangonet in Chisenga (2004), the following benefits can be realized if governments can distribute their information through the ICT tools such as the Internet and the Web:

1. Lower cost than print distribution
2. Broad distribution at relatively little cost
3. Speedy distribution at low cost
4. More information can be made accessible at lower costs
5. Government is therefore able to provide more information to the public than would have before
6. Different but important type of information can be distributed, e.g. staff members of departments, contact details, etc.
7. Access can be provided to information in remote/rural areas
8. People can respond and/or put their views across
9. Putting into effect commitment to transparency, accountability, and democratization

Commenting on the benefits of e-governance in China, Kluver (2005:76) argues that

*"e-government initiatives in China have had as their purpose not the empowerment of citizens, nor even to attract external investment, but rather to add stability and order to a chaotic governing process and social change, and to reestablish the control of the governing authorities, including improving the quality of surveillance and data gathering, and hence policy-making, the elimination of corruption, and ultimately, the re-legitimation of the Communist Party of China".*

Bar-Ilan (2005:975) defines the Web as an "enormous set of documents connected through hypertext links created by authors of Web pages". In addition, links, according to Bar-Ilan (2005) are used to improve the performance of information retrieval systems on the Internet and more so the Web. Therefore, for one to successfully access government information, he/she would require to follow particular links as provided by Web page authors, commonly known as webmasters. Links that are not well constructed or active (dead links) would make information access, on the one hand, and government-citizen or government-business interactions impossible thereby rendering the whole system of e-governance null and void for it is through the web links that citizens or the business community can reach and be reached by the government.

In view of the above, an evaluation of the websites in terms of web content and links (to and from other websites) would help to measure the performance of the various governments on the Web thereby providing valuable information which can be used in formulating relevant policies towards the improvement of the situation, specifically as regards service delivery through the Internet and the Web.

## Purpose of study

This study sought to broadly examine the web performance and impact of the Eastern and Southern African governments on the Web with a view of determining their visibility and impact. The following research questions were used to inform the study.

- How many countries in eastern and southern Africa have constructed government websites?
- Which is the most commonly language used to prepare the websites?
- How up-to-date are the government website?
- How many government and government-related institutions own websites in each country?
- Does each government website provide the most essential features (e.g. feedback forms, search engines, contact details, site maps)?
- How much has each government's site contributed in terms of web pages in each country?

- What is each government's web influence/impact?
- Are there any inter-linkages between eastern and southern African governments' websites? If so, what is the nature/type of these linkages?

## Methods and Procedures

The study employed two approaches, namely, link and content analyses, to study the web presence and impact of Eastern and Southern African governments on the Web. A total of twenty (20) countries were targeted for study. These are: Angola, Botswana, Djibouti, Eritrea, Ethiopia, Kenya, Lesotho, Madagascar, Malawi, Mozambique, Namibia, Seychelles, Somalia, South Africa, Sudan, Swaziland, Tanzania, Uganda, Zambia, and Zimbabwe. The Internet was heavily relied upon to obtain website addresses for each country. Three Internet-based online sources provided links to African countries on the Web. They include:

1. African Governments on the WWW (<http://www.gksoft.com/govt/en/africa.html>)
2. African Governments on the Internet
3. (<http://www.uneca.org/aisi/NICI/africagovintern et.htm>)
4. Foreign governments – Africa (<http://www.lib.umich.edu/govdocs/forafr.html>)

These three sources provide links to a variety of websites of a given country which in turn provide various access points to African governments' home pages. Government ministries or departments, state house or presidents, national assemblies or parliaments, prime ministers, etc are some of the national institutions whose home pages are provided by the aforementioned sites. Others include representations in foreign countries (otherwise known as foreign missions or high embassies), and political parties. At this stage, only a government's official URL address was used to conduct a content and link analysis of Eastern and Southern African governments. The portal, notes Chisenga (2004), usually provide an "entry point or access point to all or some web sites of executive and legislative organs of the government, and government agencies".

A total of 13 government portals were identified as shown in Table 1. However, when the time came to access each of these websites, Djibouti's, Uganda's and Namibia's websites could not be accessible; with

the most commonly known website access error – ‘the page cannot be displayed’ – popping up. Nevertheless, the websites were used to measure the respective government’s impact using link analysis, therefore leaving out a content analysis of the country’s website.

In order to perform a link analysis of Eastern and Southern African governments, two online indexing services (i.e. google.com and altavista.com) were used to extract relevant data using a combination of unique search queries, respectively, as follows:

1. Number of links from one government site to another (e.g. from South Africa to Kenya)  
 Google: site:gov.za (space) "[www.kenya.go.ke](http://www.kenya.go.ke)"  
 AltaVista: domain:gov.za (space) "[www.kenya.go.ke](http://www.kenya.go.ke)"

This first search strategy is a bit limited in that hypelinks are sometimes in the name of a person or institution. For example, the Kenya government’s website can be linked to using either a URL or a name hyperlink (i.e. [Government of Kenya](http://www.kenya.go.ke), or <http://www.kenya.go.ke>). This study used the aforementioned query in the believe that if when the hyprlink is in the name a particular

- government, the linking page will still provide a URL alongside the name.
2. The total number of pages linking to the website  
 Example (Google): *link:www.gov.za/*  
 Example (AltaVista): *linkdomain:gov.za/* OR *linkdomain:www.gov.za/*
3. The total number of pages at the website  
 Example (AltaVista): *domain:gov.za/* OR *domain:www.gov.za/*  
 Example (Google): *site:gov.za/* OR *site:www.gov.za/*

The Web Impact Factor was calculated in order to measure each government’s web influence (impact) as follows.

$$WIF = \frac{\text{The total number of pages linking to the web site}}{\text{The number of pages at the web site}}$$

Social networks were constructed using the Pajek computer-aided software. Tables were largely used to present the findings.

No.	Country	Government website address
1	Botswana	<a href="http://www.gov.bw/">http://www.gov.bw/</a>
2	Djibouti	<a href="http://www.republique-djibouti.com/">http://www.republique-djibouti.com/</a>
3	Kenya	<a href="http://www.kenya.go.ke">http://www.kenya.go.ke</a>
4	Lesotho	<a href="http://www.lesotho.gov.ls/home/">http://www.lesotho.gov.ls/home/</a>
5	Madagascar	<a href="http://www.madagascar.gov.mg/">http://www.madagascar.gov.mg/</a>
6	Malawi	<a href="http://www.malawi.gov.mw/">http://www.malawi.gov.mw/</a>
7	Mozambique	<a href="http://www.mozambique.mz/">http://www.mozambique.mz/</a>
8	Namibia	<a href="http://www.grnet.gov.na/">http://www.grnet.gov.na/</a>
9	South Africa	<a href="http://www.gov.za/">http://www.gov.za/</a>
10	Swaziland	<a href="http://www.gov.sz/">http://www.gov.sz/</a>
11	Tanzania	<a href="http://www.tanzania.go.tz/">http://www.tanzania.go.tz/</a>
12	Uganda	<a href="http://www.government.go.ug/">http://www.government.go.ug/</a>
13	Zimbabwe	<a href="http://www.gta.gov.zw/">http://www.gta.gov.zw/</a>

**Table 1 Eastern and Southern African governments’ websites used to conduct the study**

## Results

Results cover the following sub-themes which were derived from the purpose of the study and the research questions: language of web construction, availability and number of government and government-related institutions that own websites, up-to-datedness of websites, essential Web

features, total Top Level Domains, number of in-links and number of pages, web impact factor, and governments’ inter-linkages.

### Language in which the websites are prepared

Out of the total 13 government websites, all apart from Madagascar’s and Mozambique’s websites were in English language. Mozambique’s website was largely in Portuguese. The English version of the website is still under construction. In the case of

Madagascar, the government’s website is constructed using the French language. Unlike Mozambique, there is no English version of Madagascar’s website.

**Up-to-datedness of government websites**

There were two dates that were considered in this analysis, namely, the copyright date and the date of page or site update. There were several occasions in which there were as many different dates as there were web directories or domains or pages in a given government website(s). Sometimes each department’s website contained different dates of update from the portal’s date(s).

Every effort was made to obtain the dates from the government’s portal. Wherever the main government portal did not display any date, the page “about us” or “about the government” on the

governmental portal was used to extract the two dates where possible (e.g. South Africa). In some cases, the date of update was in the form of the “date today” (e.g. Kenya). The latter was excluded from the data analysis and only the *year* of update was considered.

Only countries with government portals were analyzed in this section. Table 2 shows that all the websites whose dates were given (i.e. 4) are up-to-date. Their copyright dates are current (i.e. beyond 2004). Majority of the sites did not provide the dates of copyright or update. South Africa provided both the copyright and update dates as shown in Table 2. It should be noted that the government websites that provided the dates of update showed that the websites are up-to-date, both having been updated in 2006, the year in which this study was conducted.

No.	Country	Government website address	Copyright date	Date of update
1	Botswana	<a href="http://www.gov.bw/">http://www.gov.bw/</a>	2006	-
2	Djibouti*	<a href="http://www.republique-djibouti.com/">http://www.republique-djibouti.com/</a>	-	-
3	Kenya	<a href="http://www.kenya.go.ke">http://www.kenya.go.ke</a>	2005	2006
4	Lesotho	<a href="http://www.lesotho.gov.ls/home/">http://www.lesotho.gov.ls/home/</a>	-	-
5	Madagascar	<a href="http://www.madagascar.gov.mg/">http://www.madagascar.gov.mg/</a>	-	-
6	Malawi	<a href="http://www.malawi.gov.mw/">http://www.malawi.gov.mw/</a>	-	-
7	Mozambique	<a href="http://www.mozambique.mz/">http://www.mozambique.mz/</a>	-	-
8	Namibia*	<a href="http://www.grnnet.gov.na/">http://www.grnnet.gov.na/</a>	-	-
9	South Africa	<a href="http://www.gov.za/">http://www.gov.za/</a>	2004	2006
10	Swaziland	<a href="http://www.gov.sz/">http://www.gov.sz/</a>	-	-
11	Tanzania	<a href="http://www.tanzania.go.tz/">http://www.tanzania.go.tz/</a>	2001-2007	-
12	Uganda*	<a href="http://www.government.go.ug/">http://www.government.go.ug/</a>	-	-
13	Zimbabwe	<a href="http://www.gta.gov.zw/">http://www.gta.gov.zw/</a>	-	-

**Table 2 Government portals’ copyright and update dates**

Note: \*Websites belonging to the three countries were not accessible.

**Government and government-related institutions with own websites**

This section presents data extracted from all the eastern and southern African countries irrespective of whether the countries had government official websites or not. Table 3 provides the number of government and government-related institutions in each country that had own websites at the time of the study. The Table reveals that a total of 13 countries have constructed government portals from which most departments and other government-related institutions can also be accessed apart from directly accessing their own websites by keying in their respective URLs in the address bar of an Internet browser. The countries include South

Africa, Uganda, Kenya, Mozambique, Namibia, Madagascar, Tanzania, Zimbabwe, Malawi, Lesotho, Swaziland, Botswana, and Djibouti. South Africa leads in the number of government and government-related institutions that have websites, which total 92 followed by Uganda (29), Kenya (25), Ethiopia (23), while Angola, Mozambique, and Namibia recorded 19 institutions each. It should however be noted that South Africa’s total number of institutions do not include the provincial/ regional governments and departments.

A comparison of different institutions indicates that foreign missions belonging to a a country were the majority (104) followed by government ministries (77), political parties (37), government portals (13),

national assemblies/parliaments (8), and presidents/prime ministers (5).

The government ministry portals provide access to government institutions that fall under respective ministries. The 'Others' comprise electoral commissions, constitutional commissions, national police, national banks, national television stations,

national radio stations, office of the government spokesperson, national bureau of standards, etc. It should be borne in mind that South Africa's system of government comprises national and provincial/regional governments which in turn consist of several regional institutions.

No.	Country	Govt. Portal	Ministries	National Assembly	President /Prime Minister	Political Parties	Foreign Missions	Others	Total
1	South Africa*	1	23	1	-	11	35	21	92
2	Uganda	1	10	1	1	1	5	10	29
3	Kenya	1	7	1	1	3	7	5	25
4	Ethiopia	-	-	1	-	6	9	7	23
5	Angola	-	5	1	-	3	7	5	19
6	Mozambique	1	6	-	-	1	2	9	19
7	Namibia	1	7	-	2	2	4	3	19
8	Sudan	-	2	-	-	2	13	1	18
9	Madagascar	1	7	1	-	-	4	5	17
10	Tanzania	1	2	1	-	2	7	3	16
11	Zimbabwe	1	-	1	-	4	2	4	12
12	Malawi	1	2	-	-	-	1	5	9
13	Zambia	-	-	-	-	-	-	9	9
14	Lesotho	1	-	-	-	-	2	5	8
15	Swaziland	1	2	-	1	-	2	2	8
16	Seychelles	-	1	-	-	1	1	4	7
17	Botswana	1	3	-	-	-	1	1	6
18	Djibouti	1	2	-	-	1	-	2	5
19	Somalia	-	-	-	-	-	1	1	2
20	Eritrea	-	-	-	-	-	1	-	1
	TOTAL	13	77	8	5	37	104	102	344

**Table 3 Government and government-related institutions that have own websites in each country**

\*Only the national government and government-related institutions were counted. Regional/Provincial institutions were not included in the national tally.

#### Distribution of the web pages according to the most commonly used generic TLDs (gTLDs)

Five generic Top Level Domains (gTLDs) [i.e. **.ac/.edu**, **.com/.co**, **.org/.or**, **.gov/.go/.gv**, and **.net**] that are commonly used to register domain names were selected and used to examine, among other aspects, each government's gTLD's (i.e. **.gov**, **.go**, or **.gv**) share of a country's total gTLDs tally. Table 3 provides the distribution of web pages according to the gTLDs in each country as well as country's total web pages (i.e. web pages that contained a country's Code TLD, i.e. ccTLD). Table 4 reveals that the leading country in the number of web pages bearing only a country's cTLD was South Africa which yielded 9368818 and 21194026 web pages in Google and AltaVista, respectively. Others that performed relatively well (in the order of Google, AltaVista) were Uganda (252949, 239740), Tanzania (145400, 221101), Zimbabwe (165850, 193040), Kenya (204700, 157900), Namibia (391340, 128973), etc. Generally, it can be also

observed that the **.co** or **.com** (commercial organizations) gTLDs recorded the highest number of web pages in most countries followed by **.org** or **.or** (non-profit making organizations) gTLDs in both indexing services. This pattern emerges when the total number of pages (third column from the bottom of Table 4) is considered. There were a total of 9597755 and 18921281 **.com** or **.co** web pages in Google and AltaVista, respectively while **.edu** or **.ac** gTLDs produced a total of 743312 and 1832534 web pages in the two indexing services. The governmental (i.e. **gov** or **go**) institutions web pages totaled 706212 and 551698 pages while the network infrastructures (i.e. **.net**) produced a total of 22619 and 34542 web pages in Google and AltaVista search engines, respectively.

No.	Country	.co + .com		.edu + .ac		.gov + .go + .gv + .government		.net		.org + .or		Total*	
		Google	AltaVista	Google	AltaVista	Google	AltaVista	Google	AltaVista	Google	AltaVista	Google	AltaVista
1	South Africa (.za)	8160000	18000000	655760	1760000	147000	414000	58	26	406000	1020000	9368818	21194026
3	Uganda (.ug)	165000	200000	15900	8540	39400	16200	0	0	32649	15000	252949	239740
8	Tanzania (.tz)	46800	168000	26800	23200	52300	17600	0	1	19500	12300	145400	221101
5	Zimbabwe (.zw)	135000	166000	7950	10300	2400	1640	0	0	20500	15100	165850	193040
7	Kenya (.ke)	157000	123000	10700	12300	21800	10100	0	0	15200	12500	204700	157900
6	Namibia (.na)	154000	99200	1440	2550	210000	22000	0	3	25900	5220	391340	128973
12	Mozambique (.mz)	85000	94900	919	626	63200	10400	1	0	12500	7050	161620	112976
15	Swaziland (.sz)	0	7160	357	318	3550	2520	0	0	11800	102000	15707	111998
10	Ethiopia (.et)	111000	2500	15100	7660	11600	12600	15700	32900	2510	1570	155910	57230
9	Zambia (.zm)	197887	34300	1218	857	7640	4490	310	135	11800	9730	218855	49512
4	Botswana (.bw)	168000	7560	228	98	26200	23300	0	0	2370	1880	196798	32838
16	Lesotho (.ls)	210000	14900	37	12	20800	3620	0	1	2580	2930	233417	21463
17	Malawi (.mw)	1524	494	607	2070	1620	1900	0	0	2480	4980	6231	9444
18	Sudan (.sd)	23	19	4160	217	28100	4420	5020	714	431	111	37734	5481
11	Madagascar (.mg)	49	34	0	0	56800	4420	0	0	327	216	57176	4670
14	Seychelles (.sc)	562	1380	171	146	893	737	1530	761	20	26	3176	3050
13	Djibouti (.dj)	0	2	25	1990	626	528	0	1	49	35	700	2556
19	Eritrea (.er)	2640	302	1940	1650	483	405	0	0	33	63	5096	2420
2	Angola (.ao)	3270	1530	0	0	11800	818	0	0	0	1	15070	2349
20	Somalia (.so)	0	35*	0	0	0	1*	0	2*	0	4*	0	229*
	TOTAL	9597755	18921281	743312	1832534	706212	551698	22619	34542	566649	1210712	11636547	22550996
	% of Total	82.5	83.9	6.4	8.1	6.1	2.4	0.2	0.2	4.9	5.4	100.0	100.0
	Average pages per country	479888	946064	37166	91627	35311	27585	1131	1727	28332	60536	581827	1127550

**Table 4 Number of web pages distributed by the most common generic TLDs (gTLDs)**

\* Somalia's gTLD pages could not be accessed in order to verify their authenticity although the domain names ended with a **.so** ccTLD

**Provision of important features on the government websites**

An examination of the governments’ websites for purposes of finding out the provision of information-related tools or services yielded the results presented in Table 5. Four aspects that are pertinent to citizen-government relationship in e-governance, namely, feedback forms, contact information, sitemap, search engines/options were considered.

Table 5 reveals that apart from Lesotho, South Africa and Swaziland which provided all the four features, the rest of the countries’ websites offered fewer than 4. Websites of four countries, namely Djibouti, Namibia, Uganda and Zimbabwe, were not accessible at the time of comparing the countries in regard to the provision of the services. Notably, the contact information (i.e. persons to be contacted, telephone numbers, fax numbers, cell-phone numbers, email addresses, etc) was provided by 9 out of the 13 countries followed by search engines (6), sitemaps (5), and feedback forms (4).

No.	Country	Feedback forms	Search Engine	Contact Info	Sitemap
1	Botswana	x	√	√	x
2	Djibouti	-	-	-	-
3	Kenya	x	x	√	x
4	Lesotho	√	√	√	√
5	Madagascar	x	√	√	√
6	Malawi	x	x	√	x
7	Mozambique	√	x	√	x
8	Namibia	-	-	-	-
9	South Africa	√	√	√	√
10	Swaziland	√	√	√	√
11	Tanzania	x	√	√	√*
12	Uganda	-	-	-	-
13	Zimbabwe	-	-	-	-
Total occurrences		√=4, x=5	√=6, x=4	√=9, x=0	√=5, x=4

**Table 5 Government’s provision of feedback forms, search engines, contact information and sitemaps**

√\* The site did not have a “sitemap” option but “about this site”

**Web pages in and links to the government portals**

Government domain pages were evaluated in order to generally compare the visibility and influence – on the web using both the Google and AltaVista search indexing services – of Eastern and Southern African countries’ government portals, on the one hand, and the entire or cumulative .go/.gov/.gv government websites, on the other hand. It was found, as expected, that there were more web pages at and links to the .go/.gov/.gv government web pages than there were web pages at and links to the government portals. For instance, Botswana yielded 22900 (AltaVista) and 1620 (Google) government portal web pages and a total of 23300 (AltaVista) and 26200 (Google) government web pages.

As the links, the country received a total of 69500 (AltaVista) and 1 (Google) government portal web pages and 73700 (AltaVista) and zero (Google) links to the cumulative government web pages. The same pattern was witnessed in all the other countries. The last row in Table 6 indicates that there were a total of 461767 governmental portal web pages in AltaVista while Google yielded a total of 204667 web pages in the same category. The cumulative government web pages (i.e. all pages that contained .go/.gov/.gv gTLDs) were 528228 and 672696 in AltaVista and Google, respectively. Links to the government portal web pages totaled 536510 (AltaVista) and 2 (Google) while all government web pages received a total of 631871 and zero links in AltaVista and Google, respectively.

**Government Web Impact Factors**

Table 6 provides the WIF for each government in both AltaVista and Google. The WIF was calculated as the ratio of the total in-links to the total web pages at the web site(s). The highest WIF was recorded by Djibouti’s government portal (i.e. 701.0 in AltaVista) followed by Uganda’s (288.0), Zimbabwe’s (235.3), Kenya’s (136.0), and Mozambique’s (47.2), all as reflected in AltaVista. In the case of Google, it was noted that all government portals recorded zero (0) WIF when rounded up to the nearest whole number.

When the total number of government web pages was considered, it was found that Zimbabwe had the highest WIF (i.e. 22.7) followed by Kenya (3.3), Botswana (3.2), Lesotho (2.1), Swaziland (1.8), Uganda (1.7), Tanzania (1.7), Malawi (1.5), Namibia (1.5), Djibouti (1.3), and Madagascar (1.1). Again, all government websites produced zero (0) WIF in Google. Cumulatively and as shown in the last row in Table 6, the government portals produced a WIF of 1.16 while all the government websites produced a WIF of 1.20 as measured using AltaVista data. The WIF, in both cases, was nil in both AltaVista and Google.

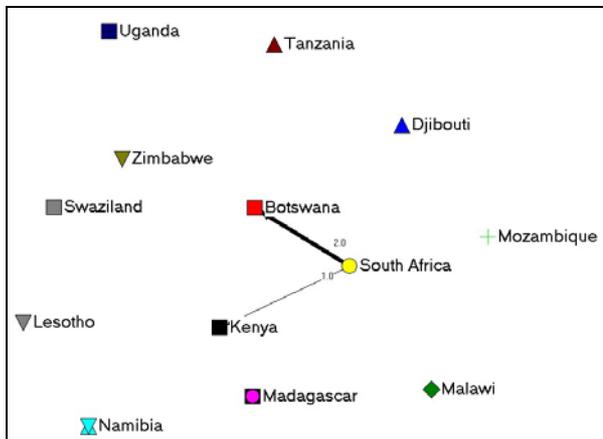
No.	Country Name	Govt. Portal only		Govt. sites (Collectively)	
		AltaVista	Google	AltaVista	Google
1	Botswana	3.0349	0.0006	3.1631	0.0000
2	Djibouti	701.0000	0.0000	1.3277	0.0000
3	Kenya	136.0000	0.0000	3.2673	0.0000
4	Lesotho	1.2359	0.0000	2.1188	0.0000
5	Madagascar	6.2867	0.0000	1.1403	0.0000
6	Malawi	1.7643	0.0000	1.5158	0.0000
7	Mozambique	47.2222	0.0000	0.8173	0.0000
8	Namibia	1.7714	0.0000	1.4500	0.0000
9	South Africa	0.8750	0.0000	0.8913	0.0000
10	Swaziland	1.7393	0.0000	1.8175	0.0000
11	Tanzania	5.2857	0.0002	1.6989	0.0000
12	Uganda	288.0000	0.0000	1.7160	0.0000
13	Zimbabwe	235.3383	0.0000	22.6829	0.0000
	TOTAL	1.1619	0.0000	1.1962	0.0000

**Table 6 Web Impact Factors**

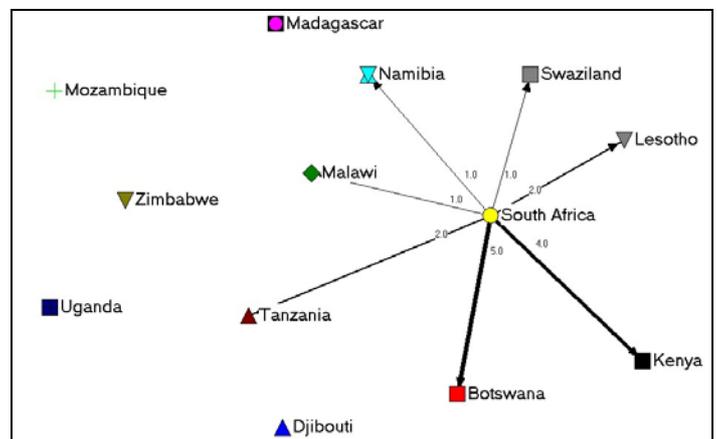
**Government inter-linkages**

The social networks shown in Figs 1 and 2 provide inter-site linkages among the government web sites. The illustrations show that it was only the South African government that provided links to other governments' websites while it received none from any of the governments investigated.

In AltaVista, South Africa provided 2 links to Botswana and 1 link to Kenya. In the case of Google, 7 countries received links from South Africa. These are: Botswana (5), Kenya (4), Tanzania (2), and Lesotho (2) while Malawi, Namibia, and Swaziland received one link each.



**Fig 1 Government inter-linkages: AltaVista**



**Fig 2 Government inter-linkages: Google**

**Discussion and conclusions**

It was observed that several governments in the region have constructed websites. Out of the total 20 countries in eastern and southern Africa, 13 (65%) provide government portals. This falls far below the expectations of many especially in this era of technology. One may ask the question, why are the other governments in the region (totaling 7) reluctant to construct their websites? Are they reluctant or is it because they have not been enlightened about the Web's benefits? Chisenga (2004) is of the opinion that African governments lack active involvement in web development. It would be interesting to conduct a study to identify reasons as to why governments in Africa are not actively participating in web development and engineering. Chisenga's study reported a total of 24 African governments with own websites, 12 of which were from eastern and southern Africa. Kenya and Swaziland were excluded from Chisenga's study because their websites were not accessible. The

same problem resurfaced during the current study where three government websites, namely, Djibouti, Namibia, and Uganda, could not be accessed. Whether they were "dead links" or the servers that host the websites were not functional could not be ascertained at the time of conducting this study. Nevertheless, it is worth mentioning that this scenario impacts negatively on a country's e-governance activities. Just like librarians often say, a 'book which is mis-shelved is as good as a lost book', any website that cannot be accessed is as good as it never existed at all. Citizens cannot keep abreast of the goings-on in the government nor can they be able to download important documents from the government website, which service e-governance is meant to provide. Another danger of

not owning a website which needs mention is related to the 'new forms of piracy' on the Web (Ndioo, 2007). According to Ndioo, individuals or companies are making huge sums of money by intentionally depriving real companies their right to own domain names. These individuals are busy registering domain names using renowned companies' names only for them to demand that company X buys the rights from them if the latter wants to use the domain name with which the former had registered 'their' company. Although this has not happened with government domain names, it is a possibility and that calls for governments to register their domain names with appropriate registration bodies not only because of the fear that their domain names may be used by others, but also for purposes of enhancing e-governance.

Previous studies (e.g. Chisenga, 2004) have shown that government Websites are used for several reasons some of which include informing the public of new developments in the government through the government such websites as the official

government spokesperson's website; full text government documents; the country's constitution; government forms, e.g. application forms for birth certificates, and visa, etc; online application facilities; government contact details; feedback facilities; frequently asked questions; and statements of responsibility. This study considered four of such features, namely feedback forms, search engines, contact details, and sitemaps. Each of these is important in its own right and contributes to effective and successful e-governance. For instance, Chisenga (2004) and Markus (2001) observe that the interaction between government and the public is stimulated with various applications. For example, people can ask questions via e-mail, use search engines, and download forms and documents while feedback facilities act as discussion tools which the public can use to comment on various government policies and decisions. It was encouraging to note that most of the aforementioned four features were provided by all of the accessible government websites. The most noticeable was the availability of contact details (telephones, emails, and person to be contacted) in all accessible government websites.

It is well acknowledged that language, among other factors, affects usability or citedness of a document (see Garfield, 1993). It is equally therefore important to state that one of the factors that may determine the usability of a web site/page is the language<sup>1</sup> in which that site/page is constructed, thereby affecting the site's/page's sitedness/linkage. Consequently, international recognition is limited if the website is in a language that is not international. It was observed that English was the most dominant language in which websites were prepared probably because of its international usage. The other languages which are used to prepare the websites include Portuguese, French and Arabic. The use of these languages in preparing the government websites and as official languages of communication in respective countries can be attributed to the countries that were colonial masters in those countries. One would argue that local national languages, e.g. Swahili, Zulu, Afrikaans, etc. should be used to prepare alternative websites to the ones prepared using international language(s). This may improve e-governance but whether it is necessary or not – given that majority of the citizens who use the

Web are well versed with the official language of communication/instruction in their countries – is debatable.

Concerning the gTLDs, it was observed that there was consistency in the use of the several variations of the gTLDs in a given country. For instance in Kenya the use of *.co*, *.or*, and *.ac* for company, organization and academic institutions was observed while South Africa uses *.co*, *.org* or *.ac*, respectively. While some countries used *.gov* (e.g. South Africa, Zimbabwe, etc), others (e.g. Angola) used several variations for one type of institution (i.e. *gov* and *.gv* for governmental institutions). Southern African countries largely used *.org* and *.gov* as opposed to Eastern African countries (except Uganda which used both variations of non-profit making organizations, i.e. *.or* and *.org*) which largely employed the use of *.or* for non-governmental organizations' domain names. Worth noting too was the dominance of *.co* or *.com* (commercial organizations domain names) TLDs in each country. The commercial organizations' web pages totaled 9597755 (Google) and 18921281 (AltaVista), accounting for 82.5% and 83.9% of the total web pages for the five gTLDs, respectively. The government Web pages were favorably represented in each country, with Google yielding a total of 706212 (6.1%) and 551698 (2.4%) pages in Google and AltaVista, respectively. This, in our view, is reflective of the real situation in each country where commercial companies are more than government institutions or any other type of institutions such as non-governmental organizations and academic/educational institutions and has nothing or very little to do with the preference of *.com* or *.co* TLD.

Another aspect that was considered when studying the government websites was the date of copyright or update. This analysis did not yield comprehensive results because most government websites did not provide either of the dates. However, results from those that provided the dates show that all the websites are up-to-date. It is recommended that all websites should provide the dates of copyright and/or update since these dates not only reflect how current the website is but also, in scholarly publishing, the date of publication is crucial especially when it comes to citation. It will also show professionalism in Web site/page construction on the part of web page authors.

Table 3 provides the number of web pages at the government and government-related institutions' websites. As aforementioned, all but seven (7)

<sup>1</sup> Language, in this case, does not refer to the computer language (i.e. the system of commands used to develop software for computers – e.g. DOS) but the natural language (e.g. English, French, Arabic, Afrikaans, Swahili, etc.)

countries in eastern and southern Africa, own government portals. The most productive of the institutions were foreign missions, followed by government ministries, political parties, and national assembly. This pattern of distribution is typical of any country where foreign missions and political parties are several while such institutions as presidents'/prime minister's, national assembly's and even ministries' offices in a country would be one each. In fact, one would not find, for instance, two offices of the 'presidency', 'prime minister', 'government spokesperson', etc. There is normally one office for each of these institutions. Even wherever there are two deputies in any particular office, they will always be classified under the name of the respective office. In addition, it is most probable that the foreign missions, especially those based in developed countries, would find it convenient and compelling to prepare their own websites because of the environment in which they are operating. Developed countries provide enabling or conducive conditions, facilities and expertise for the construction of websites. For instance, one does not need to labor so much to convince the administration of foreign missions about the need to have a Web site for the mission. Other factors that may be contributing to construction of more web sites for foreign missions that any other government and/or government-related institutions could be advanced technology and expertise which are readily available in developed countries.

Results from an analysis of the number of web pages in and links to the government portals show, as expected, that government portals yielded fewer web pages and in-links than the government websites put together. Again, AltaVista search engine produced more Web pages and in-links for each government than Google. In fact, Google produced zero in-links for most of the governments in the region. Commenting on this type of pattern, Thelwall (n.d.) says that Google only reports a fraction of links that Google is aware of (approx. 10%) which may explain why Google produced less links to eastern and southern African governments. South Africa was the most prolific as well as most linked to (sited) government. Others that yielded a large number of Web pages and in-links include Namibia, Tanzania, Lesotho, Botswana, and Swaziland.

Impact-wise and as shown in Table 7, it was almost the opposite of the above. Countries that had fewer Web pages and a large number of in-links produced higher WIFs than their counterparts. This analysis saw Djibouti leading with a WIF of 701 (from only

one web page and 701 in-links) in AltaVista followed Uganda (288) and Zimbabwe (235). It is worth noting that, in this case, we analyzed all in-links (including self-links). Collectively, all government Web sites (including those belonging to government-related institutions as long as they contained *.gov* or *.go* TLDs) yielded the highest WIF for Zimbabwe (22.7) in AltaVista followed by Kenya (3.3) and Botswana (3.2). Again, Google yielded a zero WIF for most governments. This perhaps illustrates why IFs should be used with care when assessing the quality of Web sites or pages or documents because a country like Djibouti which yielded only one (1) web page produced the higher WIF than South Africa which had 416000 web pages.

With regard to the government inter-linkages, it was observed that only the South African government provided links to other governments that were investigated. All the links to the other eastern and southern African governments originated from the Association of Law Reform Agencies of Eastern and Southern Africa, Department of Justice in South Africa. The website (URL: <http://www.doj.gov.za/alraesa/contacts/>) provides contact information of the member countries. There were no government to government linkages, i.e. links from one government portal to another. These links need to be created especially now that countries in Africa have come together to form the African Union and other regional organizations such as Southern African Development Community (SADC), East African Community (EAC) and Common Market for Eastern and Southern Africa (COMESA) and the Pan-African Parliament (PAP) which brings together parliamentarians from all over Africa.

Interestingly, while we encourage the African countries to make use of ICTs in the administration of e-governance, it is worth noting that the major impediment to the use of these tools lies with the public who could be incompetent in ICT usage. This is not only a hindrance in developing countries but also in developed countries. The UK Financial Times of May 22<sup>nd</sup> 2006 wrote, "*The UK is still struggling to get the public to use online and other electronic forms of government in spite of multi-billion pound investments in them*". A larger population of African countries does not have access to ICTs and even when the citizens have these tools, they are incapable of fully utilizing them due to their low level literacy, in general and more particularly computer literacy. E-governance will be successful if the African governments move fast to solve the myriad

problems that may hinder the effective use of the ICTs in the region, e.g. poor telecommunications infrastructure, illiteracy level, poverty, and computer or ICT phobia.

Finally, we focus our attention to ethical issues in relation to the variables outlined and discussed in sections 4 and 5 above. Firstly, while commending various governments for the construction of websites and the provision of various documents on the Web, it is advisable that the documents be published in several languages to cater for the majority needs just as the 'real space' provides. Unlike in the cyberspace where individuals access and interpret Web documents by themselves, in 'real space' they are assisted by designated government officers, i.e. especially when it comes to the completion of forms. This is the more reason why Web documents should be prepared in simple formats as well as in a language that is easily understood by most citizens. Secondly, in information ethics, two inter-related factors affect access to information, i.e. the right of access and free access (Ackerman & Britz, 2006). In this regard, governments should formulate policies governing the two issues. The big question, though, is which and how much information should the government allow free access to without compromising the security of data and the nation/country at large? It should be remembered that good governance or democracy is defined in terms of transparency and accountability. This study did not delve in detail into the content of government websites, but in regard to the four features analyzed, it was noted that most government websites offer feedback forms, contact details, sitemaps, and search engines. These are fundamental basic features that should be provided by all government websites. Another factor that affects free access, as mentioned above, is the provision of active links. Web page authors should ensure that all links to and from the government websites are working. Thirdly, as MacDonald (1995) notes, one of the Web-based features with ethical importance is what he terms as 'clarity of administrative responsibility'. He argues that websites should clearly state the owner(s), i.e. the persons responsible for the websites' administration. The same applies to government websites. It was encouraging to note that all government websites investigated in this study indicated ownership and/or administrative responsibility. Related to this feature is the date of copyright or update, which should be considered and published in each government webpage. Lastly, we borrow Rose's (2005:2-3) argument regarding situations where several

government institutions have independent websites as was witnessed in this study:

*"At its worst, each agency of a government may have its own processes controlling interaction with those it serves and distinctive information technology that is not readily compatible with other public agencies. While a single agency may be able to introduce e-governance services, citizens will be frustrated if they must sign on and off a number of different web sites when their requests involve a multiplicity of national and local offices of government".*

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